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—for not only did we boys know where the honey lay, but we prided ourselves on knowing that the white-faced carpenter-bees could not sting. As we have shown, our orioles found out this fact also. In their operations they caught the bee on the flower. This of course was done with the bill. The victim was then transferred to one foot and securely held in the claws, while the head was snipped off; then the sharp, narrow bill and tongue were applied to extract the sac containing the valued sweets. From every point of view this new habit appears to us extraordinary; and if these orioles generally get into the secret, it must needs go hard with the carpenter-bees; at least with the stingless ones or, as Patrick observes, those of the male persuasion. And then when we look at the similarity of the acquired new habits in the two cases mentioned, how remarkable the parallelism of the epicurean instincts of the Australian and the American birds! In both cases is there a singular change of the food propensities, and an equally seeming cruel wantonness in gratifying the same. As the poor victims lay before me, I was drawn to think of the old legal barbarity expressed in the judgment, “to be hung, drawn, and quartered;” for, pitiful sight, in my very hand lay these decapitated and eviscerated objects still manifesting a vestige of life in the automatic movements of the legs of the body and the palpi of the head. May it not be asked, if the birds are learning the secrets, and practising the ways of men, and even like them acquiring more refined tastes, whither will the march of intellect lead? At any rate does there not seem to be some connection of our opening homily with orioles and bumble-bees?

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## NOTES ON THE VEGETATION OF THE LOWER WABASH VALLEY.

BY ROBERT RIDGWAY.

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### II. PECULIAR FEATURES OF THE BOTTOM-LANDS.

ABOUT the middle of September, 1871, I visited Foote's Pond, in Posey County, Indiana, and in company with my botanical friend Dr. Jacob Schneck, of Mt. Carmel, Illinois, spent a day in exploring

its vicinity. This pond is a fine representative of a peculiar feature of the bottom-lands of the western and southern rivers, locally termed bayous,\* lagoons or ponds, and in all essential respects is like hundreds of others in the alluvial bottoms of the lower Wabash. Following an old, almost abandoned road through the primeval forest, guided partly by the directions of the people in the neighborhood and partly by the memory of Dr. S. who had been there several years before, we at length discovered, by an opening in the tree-tops, the close proximity of the pond. As we emerged from our tiresome passage through the tangled thickets of button bush (*Cephalanthus occidentalis*) which filled up that end of the pond and grew about 10 or 12 feet high, and stood upon its bank, a beautiful view opened before us. Entirely hemmed in by the surrounding dense forest which extended for miles in every direction, and into whose depths the fronting screen of rank and varied undergrowth prevented the eye from seeing — hiding even the trunks of the foremost rank of trees, there stretched away from us a narrow sheet of water, the calm surface of which was studded with a variety of beautiful aquatics, and its shores ornamented by a belt of extremely diversified herbage, which for variety and luxuriance we have nowhere seen surpassed outside the tropics. Along the shallow margins of the pond were acres of the magnificent *Nelumbium luteum*, its broad circular leaves supported on upright stalks, 2 to 4 feet high, and appearing like a plantation of vegetable parasols, or else resting upon the surface of the water, with the stalks submerged; the wet banks, from which the water had gradually subsided during the summer by evaporation and absorption, were covered by a rank and varied vegetation consisting mainly of *Polygonaceæ*, — among which the drooping racemes of rose-colored or carmine flowers of the *Polygonum amphibium* gave a gay and prevalent color, — and of tall and beautiful grasses and sedges of numerous species; while mingled with these prevailing forms grew, in the moister spots, patches of plants with striking and beautiful foliage and often handsome flowers as the *Sagittariæ*, and *Heteranthera* with white flowers, *Pontederia* with similar habit and blue flowers, *Echinodorus*, “blue-eyed grass” (*Sisyrinchium Bermudianum*), tufts of flags (*Iris*), etc. As we passed along, wading knee-deep, sometimes waist-deep, through this rank herb-

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\*Pronounced bi-o.

age—often overtopped by tall stalks of marsh mallows (*Hibiscus Moscheutos* and *H. militaris*) bearing large and showy white or rose-colored flowers—we finally found a canoe tied to a willow tree on the bank; this we appropriated for the purpose of investigating the pond itself, and accordingly launched out upon the flower-studded water. We paddled smoothly along at first, over the still, deep water, almost coffee-colored from the decomposition of vegetable matter, but still transparent, and looking down into its depths we could see only a tangled mass of submerged weeds of a moss-like or stringy form; then we brushed through water-lilies and, reaching out, plucked the beautiful snow-white, fragrant flowers of the lovely water nymph (*Nymphaea odorata*) or the yellow ones of the more unpretending “spatter-dock” or yellow pond-lily (*Nuphar advena*). Little yellow, star-like flowers resting on the surface of the water, with their cypress vine-like leaves submerged, were found to be the *Cabomba Caroliniana*, a common aquatic of the Gulf States, and not before found beyond them; while very curious peltate leaves, looking somewhat like miniatures of the great lotus or “yonkapins” (*Nelumbium*) beside them, but less circular in outline, were *Brasenia peltata*. As we passed plants of the *Nelumbium*, our canoe would now and then brush against the edge of one of their floating circular leaves, and set it revolving on the water like a wheel. Many leaves of this latter species which we measured were found to be 3 feet in diameter; this species was not then in flower, the blossoms having developed into those peculiar “toruses,” or top-shaped seed-cones, containing the edible, acorn-like seeds. Often we had the greatest difficulty in poling our canoe through the intricately tangled mass of floating and submerged weeds,\* which appeared to be in almost endless variety, and among which we recognized, besides the species already mentioned, various species of *Utricularia*, *Podostemon*, *Lemna*, *Wolfia*, *Potamogeton*, *Limnobium* and *Spongia*. Having satisfied ourselves with our examination of the pond itself, we then took leisurely views of its banks, as we passed along over the water. A fronting growth of graceful willows, 20 or 30 feet high, formed the most prominent feature of the shore vegetation, and in the arms of the pond a jungle of *Cephalanthus* of a lower and denser growth,

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\*In this connection it may be well to mention that this pond received its name from a Mr. Foote, a surveyor, who attempted to swim across the pond with a surveyor's chain in his hand, and becoming entangled in the submerged weeds was drowned.

with the lower branches bearded with black moss-like pendent tufts of *Ramalina*. Back of this, on every side, stood the dark tall wall of forest, against which the white arms of the huge old sycamores shone out in striking relief by the strong contrast. Arriving at the shore, and going out into the woods, we found them to be almost completely primitive in their condition, and so dark and silent that one could easily imagine himself in a wholly uninhabited region, there being few traces of the work of the axe, which mar so sadly the beauty of the forests in more thickly settled districts. The fine old trees still stood in all their majesty, above the luxuriant and tangled undergrowth of a virgin forest. The largest trees were, of course, the gigantic sycamores (*Platanus occidentalis*) with trunks 25 to 30 feet in circumference, and of varying length, and a total height of 160 to near 200 feet; but the bur oak (*Quercus macrocarpa*) was very abundant, and had attained an unusual size, very many trunks measuring 18 or 20 feet in circumference, above the larger base, and supporting a wide-spread head of astonishing massiveness. Nowhere else had we seen the sweet gum (*Liquidambar styraciflua*) growing in greater abundance and to such magnificent proportions. In the damper parts of this forest it formed the prevailing growth and seemed to vie with the majestic pecan (*Carya olivæformis*) in its towering height, and on the tall, slender, and perfectly straight trunk, supported a spreading, umbrella-shaped top. Many of these gum trees were, no doubt, 180 feet, or probably more, in height, while the longest shafts appeared to considerably exceed 100 feet in length, and were 16 or 17 feet in circumference. The white elm (*Ulmus Americana*) and honey locust (*Gleditschia triacanthos*) also approached the sweet gums and pecans in size; the height of the largest individuals being carefully estimated at 130 to 150 feet, while their girth, where the trunks became cylindrical, was found by actual measurement to be often as much as 17 feet. Most of the trees of these two species had their branches matted with the parasitic mistletoe (*Phoradendron flavescens*) which plant evinces in this region a striking partiality to these trees. The beautiful catalpa, or "cigar tree" (*Catalpa bignonioides*), grew as a common species among the underwoods and attained a common size of 60 feet in height and over 2 feet in diameter; its foliage was very luxuriant, a leaf plucked from a large tree measuring 18 inches in length by 13 in breadth. The other underwoods were

chiefly pawpaw (*Asimina triloba*), mulberry (*Morus rubra*), sassafras (*Sassafras officinale*), red-bud (*Cercis Canadensis*), iron woods (*Carpinus Americanus* and *Ostrya Virginica*), mixed with numerous other smaller trees, as *Amelanchier Canadensis*, wild plums, crab apple (*Pyrus coronaria*), several species of haws or thorn apples (*Crataegus*), flowering dogwood (*Cornus florida*), black haw (*Viburnum prunifolium*); while the shrubby undergrowth, which was frequently too dense to penetrate without cutting, consisted in the main of prickly ash (*Xanthoxylum Americanum*), hop tree (*Ptelea trifoliata*), bladder nut (*Staphylea trifolia*), burning bush or "Wahoo" (*Euonymus atropurpureus*), *Crataegus spathulata*\* and several species of *Cornus*, besides numerous other shrubs. The prevalent undergrowth, however, consisted of spice wood (*Lindera benzoin*) which grew 10 or 12 feet high, its branches often forming a complete canopy overhead, which entirely shut off the view of the tree-tops.

In the "hollows" parallel to the river, the small cane (*Arundinaria tecta*) formed dense brakes and grew 10 or 12 feet high, the canes matted with thorny "green brier" (*Smilax* several species) and mixed with tall stinging nettles (*Urtica* and *Laportea*); or where the cane was scant or absent, the ground bristled with *Equisetaceæ*. In the more open portions of the woods the herbaceous vegetation was more luxuriant, consisting, in the main, of rank nettles (*Urtica* and *Laportea*), tall iron weeds (*Vernonia*) and silk weeds (*Asclepias*), associated with an apparently infinite variety of other weeds of similar habit.

In lower spots the "lizard-tail" (*Saururus cernuus*) was the predominant plant, and when in flower imparted a pleasing fragrance to the locality. In the more open glades numerous vines flourished in great luxuriance; grape-vines (of half a dozen species) canopied with their foliage the smaller trees, or ascended to the tops of the very tallest. The winter grape (*Vitis cordifolia*) often grew to a great size, many vines measuring 24 and some 40 inches in circumference several feet from the ground,—sometimes dangling from a branch a hundred feet overhead, as often stretching like a cable from one tree to another, or twisted in fantastic and intricate contortions as they wrapped the trunks or swayed from them. The gaudy trumpet creeper (*Tecoma radicans*) with its vivid clusters of large and conspicuous tubular orange-red

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\* Heretofore considered of more southern habitat.

flowers accompanied the grape-vines in their riot among the branches, or with the luxuriant poison vines (*Rhus radicans*) adorned the trunks; it was growing to a remarkably large size, a trunk of this species which we measured being 41 inches in circumference at several feet from the root. The splendid *Wistaria frutescens* climbed up the trees and draped their branches; the graceful cross vine (*Bignonia capreolata*) crept perpendicularly up the larger trunks, its dark green, lanceolate leaves, arranged symmetrically in right angles with the stem, and its clusters of trumpet-shaped carmine and yellow flowers, or long pendent pods, the flowers being then nearly all gone, rendering this fine creeper an object of striking beauty. The old decaying trunks, on every hand, were encased in a thick matted covering of the Virginia creeper (*Ampelopsis quinquefolia*), and appeared like huge columns draped in green. Smaller woody vines, as the *Cocculus Carolinus*, moonseed (*Menispermum Canadense*), wax-work (*Celastrus scandens*), green briars (*Smilax rotundifolia*, *S. glauca*, *S. tamnoides*, *S. Walteri*! *S. lanceolata*! and perhaps one or two other species), pipe vines (*Aristolochia*) and many others screened the shrubbery or festooned the underwood, while a great variety of herbaceous vines, far too numerous to name in full, trailed over the undergrowth or ran up the shrubbery. Chief among these were the virgin's bowers (*Clematis Pitcheri*, *C. viorna* and *C. Virginiana*), the yellow passion flower (*Passiflora lutea*), wild cypress vine (*Quamoclit coccinea*), wild blue morning glory (*Ipomœa nil*), Rutland beauty (*Calystegia sepium* and *C. spithamea*) balsam apple (*Echinocystis lobata*), wild hop (*Humulus lupulus*), wild yam (*Dioscorea villosa*) and carrion flower (*Smilax herbacea*). Besides these were the several species of dodder (*Cuscuta*) which spread a carpet of orange-colored yarn, as it were, over the herbage, and numerous species of delicate *Leguminosæ*, with handsome pea-like flowers, nestled meekly beneath the ranker herbage, or accompanied the other vines in their spiral ascent. Very often the smaller vines twined around the larger; and in one instance we noticed five species thus ascending one tree. They were *Rhus radicans*, *Tecoma radicans*, *Smilax rotundifolia*, *Celastrus scandens* and *Menispermum Canadense*.

In this neighborhood we found no cypress swamps and did not hear that any occurred there. But about twenty or thirty miles to the northward, just across the mouth of White River and on the

point of land known as "the neck" between that stream and the Wabash, is a cypress swamp of very considerable extent, embracing, according to the report of the Indiana Geological Survey (p. 179), an area of 17,000 acres! I have visited this swamp, but as yet have only just entered its borders, a penetration into its centre being almost a matter of impossibility; and, if possible, is attended by great difficulties and fatigue. In June and July, 1871, I made several attempts to explore to my satisfaction these cypress ponds, but partly from want of familiarity with the locality, and partly from the great difficulties encountered in penetrating the almost impassable undergrowth and débris, became tired out before I had fairly found myself surrounded by cypresses. In these swamps, the bald cypress (*Taxodium distichum*) is, of course, the prevailing growth; but the gigantic pillars of this species overtop a smaller growth of such trees as *Nyssa uniflora*, *Liquidambar styraciflua*, *Gleditschia monosperma*, and such others as require a boggy situation. Though the finest accessible trees of the cypress had been long destroyed, there were yet a few standing which appeared to approach, perhaps to exceed, 150 feet in height, while there were trunks, with immense conical bases, more than 10 feet in diameter. I have no doubt, however, that the almost inaccessible recesses of the swamp contain trees of this species of far greater dimensions. In the portion of the "swamp" which I was able to penetrate, the ground was not overflowed, but moist, or in a few spots boggy, with now and then a lagoon of clear water—clear of trees, but filled up with aquatic plants. One must penetrate such a place before he can appreciate its difficulties; then before he has penetrated fifty feet he is likely to have stumbled over a dozen logs, butted, every few steps, against a cypress "knee" concealed in the rank weeds, and thereby tumbled head-foremost into a thorny bush, or mired in the black mud. After such an experience, stopping on a prostrate log to rest, I prepared to contemplate my surroundings as calmly as I could while wiping the sweat from my eyes, and panting with the rough treatment I had met. Except upward, a view in any direction could not possibly extend beyond a few rods. The tall cypresses stretched their arms overhead, though often they were concealed by the intervening growth of smaller trees, or by the close canopy of button bush (*Cephalanthus*) and spice wood (*Lindera*). The fallen trunks, in every position, from an angle of



45°, as when arrested in their fall by another tree, to the prostrate log, were in every stage of decay. Some, as they lay rotting on the damp ground, were as high as the head, and all completely overspread by a varied growth of weeds, which here take a hold upon every available spot, covering as completely the logs and rubbish as they do the ground.

Emerging, in a somewhat dilapidated condition, from this underwood, a beautiful and entirely different scene lay before me; a "pond," but instead of a sheet of dark stagnant water, there spread out before me a sea of green vegetation, with the grasses and sedges waving, and the *Nelumbiums* nodding, in the gentle breeze, while the graceful, delicately foliated willows, which fringed its borders, swayed with every impulse of the wind. Above the latter reached upward the spires of the tall cypresses, which stretched out their arms, clad in their fine light green feathery foliage; but even these were overtopped by occasional gigantic sycamores which overlooked the entire forest, stretching out for miles on every side. This pond, which occupied an area of about a mile and a half in length by a maximum breadth of perhaps half a mile, was at this time nearly dry, in consequence of the protracted summer's drought. The bed from which the water had entirely disappeared was covered with a luxuriant growth of handsome and varied species of grasses and sedges, while in the damper spots stood tall blades of *Scirpus* and *Typha*; and, in the dryer places, patches of tall marsh mallow (*Hibiscus militaris* and *H. Moscheutos*). Toward the centre of the pond the ground grew gradually moister, and sustained a growth of *Pontederia*, *Sagittariæ*, etc., then miry, and supporting the broad circular leaves of *Nelumbium*, and finally formed pools of shallow water, filled with *Nuphar*, *Nymphæa* and other plants, which, being inaccessible to us, we could not determine. As we walked along, about knee-deep in the grasses and *Polygonaceæ* of the dryer border of the pond, we shot a large specimen of *Nerodia erythrogaster*, as it lay on the black mud, from which I did not distinguish it until almost stepped upon. As the moister portions were neared, the great blue herons (*Ardea herodias*) would fly up, startling the intruder with their horridly discordant squawk, sometimes accompanied in their retreat by great white herons (*Herodias egretta*); and once a flock of a dozen or twenty wood ibis (*Tantalus loculator*) were disturbed in their rest upon the branches of an old dead sycamore

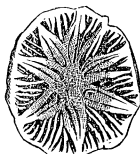
that overhung the bank, by a shot which we hazarded at some as they flew from a pool a hundred yards or so ahead of us. In the solitude of such places as this, these birds find secure retreats; and from the half dried-up pools have their fill of fishes, crustacea and reptiles which, when the water becomes nearly exhausted by the summer's drought, are so numerous in the little pools to which they are confined as to keep the water in constant agitation.

## THE CALIFORNIAN TRIVIA AND SOME POINTS IN ITS DISTRIBUTION.

BY ROBERT E. C. STEARNS.

IN the month of March, 1868, Mr. W. G. W. Harford and myself made a short visit to Monterey for the purpose of collecting, devoting most of the time to an investigation of the outer or ocean shore of Point Piños in the vicinity of the lighthouse. Here are great numbers of granite boulders which have been thrown up by the sea; by wading in at low tide to a depth of two or three feet, and conveying to the shore such stones as could be lifted by us, we were able to make a deliberate and careful examination. Upon the under side of some of the heavy boulders, we found

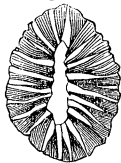
Fig. 144.



Balanophyllia.

numerous colonies of the corals, *Paracyathus Stearnsii* and *Balanophyllia elegans* (Fig. 144), described by Prof. Verrill of Yale; when first taken from the water and therefore alive, these corals are of a beautiful red color, a shade between orange and scarlet, and vivid as a coal of fire; when dead the stony portion soon fades and becomes a dingy white. Upon these brilliantly colored coral animals, the animal of *Trivia Californica* (Fig. 145, shell, enlarged twice) subsists, at least in part, for I cannot assert that it does not, like other Californians, seek a variety in its bill of fare, and it is not unlikely that it feeds sometimes upon the jelly-like portion of the living sponges.

Fig. 145.



Trivia, shell.

The animal of *Trivia Californica* (Fig. 146, enlarged twice) is of the same color as the animal of *B. elegans*; the mantle and